REMARKS/ARGUMENTS

The specification has been revised to conform it to the preferred format for U.S. patent applications as required in the Office Action, and a Substitute Specification and Comparison Copy are submitted herewith.

Claims 1-8, 10 and 13-19 are pending in this application. Claims 1-8 and 10 have been amended, claims 13-19 are new, and claims 9, 11 and 12 have been canceled.

The claims were reworded to substitute the routinely used "wherein" for the less common "characterized in that" for purposes of clarification unrelated to patentability concerns.

The drawings were objected to because they did not show the subject matter of claims 9, 11 and 12. These claims have been canceled. Accordingly, the drawings as originally filed require no further changes.

Claims 2, 3, 6 and 8 were rejected under Section 112 because they recited ranges within ranges. These claims were amended to delete multiple ranges, and claims 13-18 have been added to cover subject matter deleted from claims 2, 3, 6 and 8.

In view of the foregoing, applicants request that the Section 112 rejection of the claims be withdrawn.

Claims 1, 4, 5 and 7 were rejected for anticipation by Billingsley (4,139,309).

Billingsley teaches a device for the processing of plastic waste, including an agitator (24, 32, 34) (which is not a shredding device as asserted in the Office Action). The agitator is arranged in a casing (10) and comprises an axis of rotation (24) on which a pair of interrupted flights 32, 34 are mounted, each comprised of an open double ribbon arrangement of coaxial spiral flights having different diameters and being of opposite hand. (Col. 2, lines 52-55). The flights 32, 34 are NOT knives, but agitating means. In operation, when shaft 34 is turned in the direction indicated by the rotational arrow in Fig. 3, the material near the shaft 24 moves from the center outward and the material near the outside of the outer flight moves from the ends inward as indicated by the arrows. This structural configuration eliminates any material

packing at the discharge from the agitating zone 20. In addition, the circulation afforded by the action of the flights 32, 34 tends to keep the bulk density of the scrap material uniform as well as mixing various cut lengths or sizes of material to make this more uniform prior to transfer. (Col. 3, lines 5-23).

"With this arrangement it is possible to discharge from the agitation zone 20 of the hopper with a material held in the storage zone of from up to 20 to 30 feet or greater at substantially zero pressure." (Col. 3, lines 26-29).

Contrary to the assertions in the Office Action, there is no shear between the agitator and the extruder screw, for the following reasons:

- The hopper 10 comprises from top to bottom a storing zone 18, an agitating zone 20 and a transfer zone 22 (col. 2, lines 44-46). The agitator 24, 32, 34 is arranged in the agitating zone 20. The extruder screw 36 is arranged in the transfer zone 32. As can be clearly seen in Fig. 3, there is a considerable distance between the agitating zone 32 and the transfer zone 32 depicted by the braces at the right side of the drawing. This considerable distance precludes creating of a shearing action between the flights 32, 34 and the extruder screw 36.
- Billingsley explicitly teaches that the material is discharged from the agitation zone 20 of the hopper 10 to the transfer zone at substantially zero pressure. (Col. 3, lines 26-29). When there is no pressure, no shearing action can be created.
- As has been explained above, the function of the flights 32, 34 is to create a circulation of the scrap material within the agitating zone 20 as shown by the arrows in Fig. 3. If the agitator 24, 32, 34 would actually communicate with the extruder screw 36 in that the flights 32, 34 are moved past the extruder screw 36 at a spacing sufficiently small to form shear gaps between the flights 32, 34 and the extruder screw 36, the resulting shear action would inevitably interrupt circulation of the scrap material and would thereby render the device of Billingsley useless.

- The flights 32, 34 do not have any knife portions, which would be necessary to create a shear with the extruder screw 36.
- The only location in Billingsley's device for the processing of plastic waste where a shear action is created is at the material transfer conduit 14. The spiral flight extruder screw 36 extends through the material transfer conduit 14 wherein its flight is closely sized to the walls of conduit 14 (col. 3, lines 35-40).

Hence, Billingsley does not anticipate claim 1 of the present application.

With respect to claims 4, 5 and 12, it is to be observed that the known device for the processing of plastic waste does not have a shredding device with knives disposed around the periphery of the shredding device. Hence, these claims are also not anticipated by Billingsley.

Further, in contrast to the view expressed in the Office Action, the discharge opening is not arranged roughly at the mid-point of the length of the "shredding" device. Rather, the discharge opening of the agitating zone 20 is considerably offset from the mid-point of the agitator 24, 32, 34, as is clearly seen in Fig. 3. Hence, claim 7 is not anticipated by Billingsley.

Claims 1, 4 and 6 were rejected for anticipation by Ambrette (3,114,933).

Ambrette teaches an apparatus for continuously preparing and extruding plastic compositions, comprising means to mix the ingredients of a plastic composition and then delivering the prepared composition to the receiving end portion of a housed rotating helical extruder screw. In more detail, this known apparatus for continuously preparing and extruding plastic compositions comprises a longitudinal mixing trough having a rearward end into which the ingredients of the composition desired to be extruded are introduced. (Col. 2, lines 36-44). Located below the trough is an extruding screw, to the receiving end portion of which the composition discharged from the mixing trough 10 is to be delivered. This extruding screw comprises a screw conveyer 15 rotatably mounted in the bore of a housing 16. The housing 16 is provided with an opening 18 located above one or more rearward helical flights 19 of the screw conveyer 15, so that the opening 18 communicates with composition receiving spaces 20 between the rearward flights. (Col. 2, lines 55-66).

Interposed between the mixing trough 10 and the extruding screw is means for positively or force feeding a produced composition from the mixing trough to the extruding screw. This force feeding means comprises a casing 22, the interior of which provides a passage 24 which extends in longitudinally parallel relation to and between the mixing trough 10 and the housing 16 of the extruding screw. The passage 24 is open at its top end and likewise open at its bottom side for communication with the intake opening 18 of the housing 16. (Col. 3, lines 3-21). Extending horizontally through the interior of the casing 22 and across the passage 24 is a composition transfer means, comprising a pair of laterally spaced-apart horizontal shafts 26 and 27. Each shaft is provided with blades 28, 29 extending radially in different directions from the shafts. The shafts 26, 27 and consequently the blades 28, 29 revolve in opposite directions. The blades 28, 29 are of such radial extent that their free edges will sweep the surface of the side wall of casing 22, thereby causing the blades to purge one another of composition which might tend to adhere thereto and assuring a positive and uninterrupted movement of a composition from the mixing trough 10 to the receiving end portion of the conveyer screw 15. (Col. 3, lines 21-60). The blades 28 can be replaced by fingers 34, 35. (Fig. 4; col. 4, lines 26-35).

However, the transfer means 26-29 do NOT constitute a shredding device (as asserted in the Office Action), since the transfer means 26-29 do not comprise knives. Blades 28, 29 are not knives, and particularly their free edges sweeping the surface of the side wall of casing 22 cannot and are not intended to cut any composition. Moreover, if the blades were knives, they could damage the surface. This becomes clear when bearing in mind the suggestion of Ambrette to substitute fingers 34, 35 for the blades 28, 29.

Further, the arrangement of the transfer means with two shafts laterally spaced from each other does not allow for the formation of a shear gap, as is explained with reference to Fig. 2 of Ambrette reproduced below. The revolving free edges of the blades 28, 29 form rotational cylinders C1, C2, drawn into Fig. 2 below, as does the flight 19 of the extruder screw 15. Consequently, there is a considerable "free space", shown in Fig. 2 below, between the blades 28, 29 and the extruder screw 15. In this regard, Ambrette explicitly states that the

function of the blades (or fingers) is to assure positive and uninterrupted movement of the plastics composition into the spaces 20 between the helical flight 19 of the screw conveyer 15.

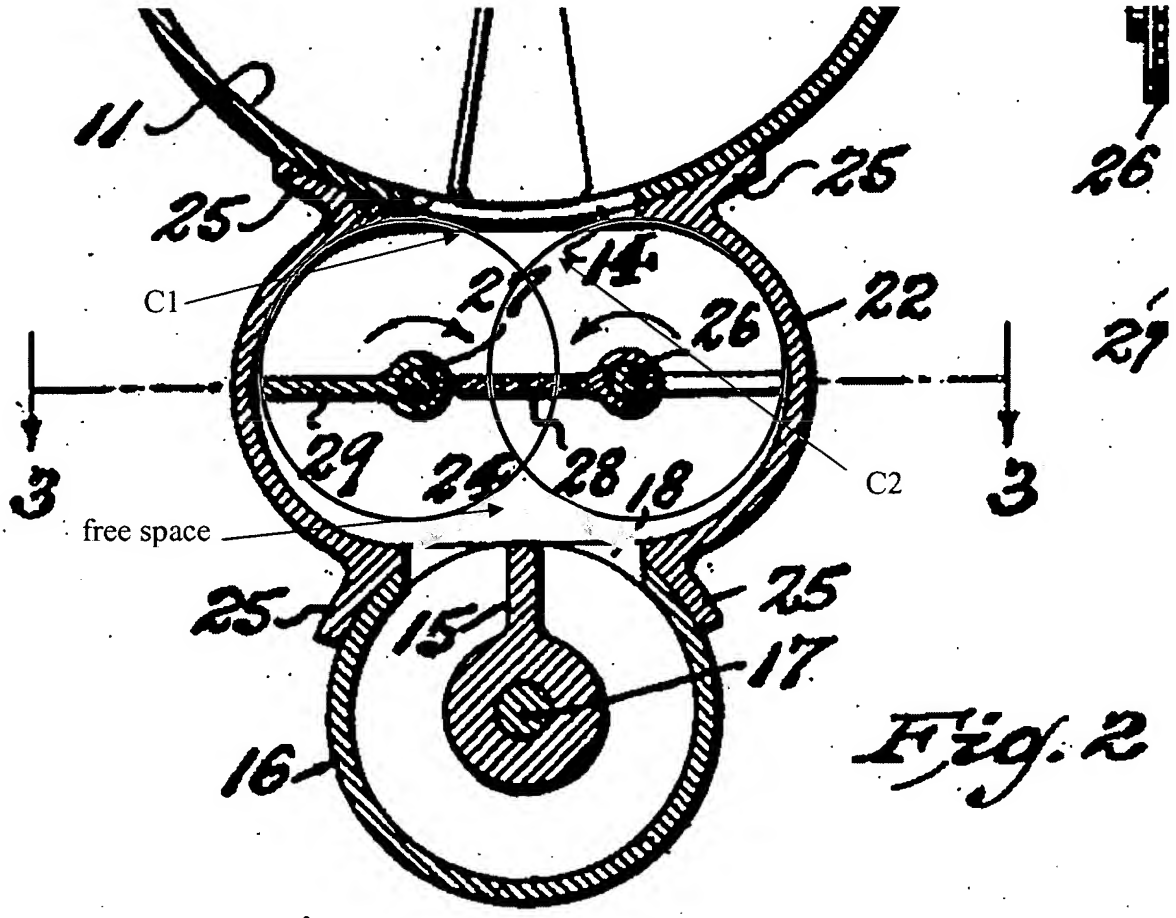

Fig. 2

In view of the foregoing, applicants submit that Ambrette does not anticipate claim 1 of the present application.

With respect to claims 4 and 6, it is to be observed that the known device for the processing of plastic waste does not have a shredding device with knives disposed around the periphery of the shredding device. Hence, these claims are also not anticipated by Ambrette.

Claims 1, 3-5 and 7 were rejected for anticipation by Crabb (5,281,071).

Crabb discloses a portable ice storage and dispensing system. Its disclosure has no relevance to the present invention, which relates to a device for the processing of plastic waste. In contrast, the system disclosed by Crabb relates to preparing fresh food products such as fish or produce for shipment from the site of harvesting to market, and more particularly, to a method and apparatus for providing easily movable and quickly erectable portable large capacity bins for bulk storage and dispensing of ice or similar materials. (Col. 1, lines 6-12). The ice storage and dispensing system 10 comprises a storage bin 11, 100 that is loaded with fragmented ice through the top 17 by conveying means 18 to form an ice mass 19. Ice is cut from the underside of the ice mass 19 and enters a discharge conveyor 16, 117 which carries the ice to the exterior of the storage bin 11, 100 and ejects it for use in icing cartons of produce. The ice storage bin 11, 100 is constructed of wall panels 12, quick-fastened to corner posts 13, which are secured to a foundation frame 14. At the bottom of the storage bin 11, 100 is disposed a traversing auger 15, 110 which both traverses and rotates under the ice mass 19 (Fig. 1). After a near full traverse, the ice mass 19 falls, and the traversing direction is reversed. The traversing auger 15, 110 travels the length of the storage bin 11, 100 in both directions while simultaneously rotating, thereby undercutting the ice mass 19. The cut ice is conveyed by the traversing auger 15, 110 toward the center of the storage bin 11, 100 and into the discharge conveyor 16, 117 which carries the ice to the exterior of the storage bin 11, 100 and ejects it.

The discharge conveyor 16, 117 is a simple screw conveyer, and is not an extruder screw, because extruding the ice mass would result in melting it, which would be exactly the opposite of what Crabb aims at.

Although the traversing auger 110 has opposite hand helical flighting 119 and cutting teeth 120, the cutting teeth 120 are merely used to cut ice fragments from the underside of the ice mass 19. There is no disclosure of effective shear gaps between the teeth 120 of the auger 110 and a helix of the discharge conveyor 117. Such a shear gap would make no sense at all in Crabb, because:

- There is no ice to be cut between the auger 110 and the discharge conveyor 117. Rather, when the auger 110 undercuts the ice mass, the ice fragments immediately

drop down, either directly onto the discharge conveyer 117 or onto the bottom of the bin from where they are conveyed by auger 110 to the left and right sides of discharge conveyer 117. The sliding and transporting characteristic of ice is in no way comparable to that of plastic waste and resembles that of liquids.

- Exerting a shear action on the ice fragments would inevitably result in melting the ice, which would impair the usability of Crabb's portable ice storage and dispensing system.

Therefore, Crabb cannot and does not anticipate the present invention as defined by independent claim 1 as well as by claims 3-5 and 7.

Claims 1, 3-7 and 10 were rejected for anticipation by Barth (6,126,100).

Barth discloses a device for the processing of thermoplastic synthetic waste. This device comprises a machine housing 1 with a delivery cone 12 in whose feed shaft 14 a driven slider 30 presses synthetic material which is to be processed and which is located on a base plate 7 through a feed inlet 11 of a conveyor tube 6 against a processing drum 3 which is placed perpendicularly in the conveyor tube 6 in relation to the direction of the movement of slider 30. The feed inlet 11 extends over the entire knife supporting section 17 of the processing drum 3. Knives 4 are placed thereon in a helical line 28 and operate in conjunction with a fixed counter knife 5 that is fastened to the opening edge 25 of the feed inlet 11. The knives 4 and the associated screw conveyor 9 convey disintegrated synthetic material in axial direction 20 though the conveyor tube 6 towards an outlet 10, which leads downwards into the screw tube 22 of the extruder screw 8 through which the synthetic material is delivered. With reference to Figs. 4 and 5, the processing drum 3 comprises a knife supporting part 17 and a discharge member supporting part 18, the discharge members 19 of which are constituted by a conveyer screw 9. At an end portion of the processing drum 3 adjacent to the conveyer screw 9, a cutter bush 36 is attached to the processing drum 3. (Col. 8, lines 11 and following). The cutter bush 36 supports in knife holders 40 circulating knives 37, wherein the knife holders 40 are arranged in two adjacent radial rows. The circulating knives 37 are disposed lying thereby with frontwardly disposed edges in axial planes 53 of the processing drum 3. The circulating knives 37 cut the

material to be processed against the spatially fixed knives 37' which are attached at knife holders 40'. Knives 37' are aligned in a row parallel to the axis of the processing drum 3 and are attached on a receiver part 38 that is inserted and screwed together through a sideways disposed access opening at the conveyor tube 6. The circulating knives 37 mesh thereby with the spatially fixed knives 37' in the circulation direction 25 from below to the top and thereby cut with the side edges. (Col. 8, lines 38-48).

Hence, the processing drum is divided into three axial portions, i.e.:

1. the knife supporting part 17 to which the plastic waste is radially fed through a feeding opening;
2. the discharge member supporting part 18 being constituted by a conveyer screw portion axially conveying the plastic waste that has been cut within the knife supporting part 17 to the cutter bush 26 and further against a disc 39 defining the end portion of the processing drum 3; and
3. the knife supporting cutter bush 36 having the function to separate the plastic waste that is axially impacting against the disc 39 and which has already been cut and compacted upstream.

The device for the processing of plastic waste according to the present invention differs from the device disclosed in Bart in that only one shredding device 9 is provided to which plastic waste to be shredded is radially fed, wherein a discharge opening 6 is arranged directly at the shredding device 9. The shredding device 9 communicates with the extruder screw 4 by means of the discharge opening in that the shredding device 9 delivers the plastic waste through the discharge opening 6 to the extruder screw 4, wherein at the same time the knives 3 of the shredding device 9 are moved past the extruder screw 4 at such a small distance "h" that effective shear gaps are formed between the knives 3 of the shredding device 9 and a helix 4a of the extruder screw 4. Due to these measures of the present invention, it has surprisingly been achieved to continuously supply appropriately cut plastic waste without having to use the sophisticated design suggested by Barth, i.e. without having to provide a processing drum with a first cutting part, a compacting part and a second cutting part with the function to prevent

clogging of the discharge opening by compacted plastic waste material. A further disadvantage of the device disclosed by Barth is that the extruder is tangentially flanged downstream of the conveyer screw whereby the plastic waste material is always transported to the bearing at the discharge side, resulting in redirecting the compacted material at its entry into the extruder, which in turn results in an increased thermal decomposition.

The recitations in present claim 1 clearly distinguish the claim from Barth. Hence, Barth does not anticipate claim 1.

Dependent claims 2-8, 10 and 13-19 are directed to specific features of the present invention which are patentable in their own right. These claims are further allowable because they depend from allowable parent claim 1.

CONCLUSION

In view of the foregoing, applicants submit that this application is in condition for allowance, and a formal notification to that effect at an early date is requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (415) 273-4730 (direct dial).

Respectfully submitted,

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